



September 25–27, 2006

Cal EPA Headquarters  
Sacramento, CA



# MONDAY, SEPTEMBER 25

Symposium in Session 1:00 p.m. – 6:00 p.m.

## Session I: Introduction

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- 1:00 PM **Welcome**
- 1:10 PM **Opening Remarks** – Linda Adams, Cal/EPA Secretary and Dr. Robert Sawyer, Chair of the Air Resources Board
- 1:35 PM **ZEV Expert Panel Update** – Michael P. Walsh, Chair, Expert Panel
- 2:00 PM **Innovative Clean Air Technologies (ICAT) Briefing** – ARB Staff

## Session II: Hydrogen Technology

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Chair: Gerhard Achtelik

- 2:10 PM **Andy Abele, Quantum**  
Quantum Hydrogen Storage Products
- 2:35 PM **Ben Ovshinsky, Ovonics**  
ECD – Ovonic's Hydrogen Economy Enabling Technologies – Storage, Infrastructure, and Vehicles
- 3:00 PM **Tobias Brunner, BMW**  
Liquid Hydrogen Vehicle Storage
- 3:30 PM Break**
- 3:40 PM **Chris Guzy, Ballard Power Systems**  
Fuel Cells for Transportation Applications
- 4:10 PM **Margaret Steinbugler, UTC Fuel Cells**  
PEM Fuel Cell Technology Readiness for Light Duty Vehicles
- 4:40 PM **Keith Wipke, NREL**  
Fuel Cell Vehicle/ Infrastructure Results from Learning Demo
- 5:10 PM **Ravi Gopal, Hydrogenics**  
PEM Fuel Cell Power Modules, Systems, and Applications
- 5:35 PM **Joan Ogden, U.C. Davis, ITS**  
Strategies for Building a Hydrogen Infrastructure
- 6:00 PM Day One End**

# TUESDAY, SEPTEMBER 26

Symposium in Session 8:30 a.m. – 5:15 p.m. | Open Comment 5:15 – 6:15 p.m.

## Session II: Hydrogen Technology (continued)

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Chair: Craig Duehring

- 8:30 AM **Andy Abele, Quantum**  
Quantum Hydrogen Prius
- 8:55 AM **Chris White, Sandia**  
Technical Review of Hydrogen-fueled Internal Combustion Engines
- 9:20 AM **Edgar Berger, BMW**  
BMW H2 NZEV Development
- 9:50 AM Break**

## Session III: Car Company Updates

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Chair: Analisa Bevan

- 10:00 AM **Fred Maloney, Daimler Chrysler**  
Daimler Chrysler Activities
- 10:25 AM **Ben Knight, Honda**  
Honda Activities

- 10:50 AM **Bob Cassidy, Nissan**  
Nissan Activities
- 11:15 AM **Dave Hermance, Toyota**  
Toyota Activities
- 11:40 AM Lunch**

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#### Session IV: Battery Technology

Chair: Craig Childers

- 12:40 PM **Larry Oswald, GEM**  
The Impact of Neighborhood Electric Vehicle Use on Improving Air Quality in CA
- 1:05 PM **David Hirsch, Miles Automotive Group**  
Miles Automotive Activities
- 1:20 PM **Tom Gage, AC Propulsion**  
Recent Electric Vehicle Developments
- 1:45 PM **Alec Brooks, AeroVironment**  
AeroVironment Activities
- 2:15 PM **Ian Wright, WrightSpeed**  
WrightSpeed Activities
- 2:35 PM **Martin Eberhard, Tesla Motors**  
Tesla Motors Activities
- 3:05 PM Break**
- 3:15 PM **Stuart Evans, Delta-Q**  
Charger Products
- 3:30 PM **Sven Thesen, PG & E**  
Residential Customer Off-Peak Electrical TOU Options & BEV/PHEV Impacts
- 3:55 PM **Jasna Tomic, WestStart – CALSTART**  
ZEVs in V2G Applications
- 4:20 PM **Willett Kempton, University of Delaware**  
Modeling V2G for a Utility with a High Wind Generation Portfolio
- 4:45 PM **Eugene Nishinaga, BART**  
Use of ZEV with V2G to Support BART Electrical Demand
- 5:15 PM Open Comment Period
- 6:15 PM Day Two End**

## WEDNESDAY, SEPTEMBER 27

Symposium in Session 8:30 a.m. – 5:15 p.m. | Open Comment 5:15 – 6:15 p.m.

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#### Session IV: Battery Technology (continued)

Chair: Mark Duvall

- 8:30 AM **Mark Duvall, EPRI**  
Welcome and Introduction to Plug-in Hybrids
- 8:40 AM **Tony Markel, NREL**  
PHEV Performance and Efficiency
- 9:10 AM **Danilo Santini, Argonne National Laboratory**  
Energy and Petroleum Consumption Attributes of PHEVs
- 9:40 AM **Mark Duvall, EPRI**  
PHEV System Technology Update
- 10:00 AM Break**

- 10:10 AM **Matt Miyasato, SCAQMD**  
Plug-In Hybrid Sprinter Program
- 10:40 AM **Max Kapadia, ASG renaissance**  
PHEV Vehicle and Lifecycle Costs
- 11:10 AM **Eladio Knipping, EPRI**  
Environmental Impact of PHEVs
- 11:30 AM **Charlie Clark, Charles Clark Group**  
Electricity and Infrastructure
- 11:50 AM **Mark Duvall, EPRI**  
Conclusions and Wrap-Up
- 12:00 PM Lunch**

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## Session V: Energy Storage Batteries

Chair: Andrew Burke

- 1:00 PM **Andrew Burke, U.C. Davis, ITS**  
Welcome and Introduction
- 1:05 PM **Tien Duong, U.S. Dept. of Energy**  
Review of the DOE/US ABC Battery Program as it Relates to EVs and PHEVs
- 1:25 PM **Michael Andrew, Johnson Controls**  
Status and Prospects for Conventional Lithium-ion Batteries for EVs and PHEVs
- 1:45 PM **Andrew Burke, U.C. Davis, ITS**  
Status and Prospects for Zebra and Nickel Metal Hydride Batteries for EVs and PHEVs
- 2:05 PM **Mark Duvall, EPRI**  
Battery Considerations and Test Results for Lithium-ion Batteries in the Sprinter PHEV
- 2:25 PM **Andrew Chu, A123 Battery Co.**  
Design Considerations and the Status and Future Plans for Lithium-ion Batteries using Iron Phosphate in the Cathode
- 2:45 PM **Evan House, Altairnano**  
Status of Lithium-ion Batteries using Lithium Titanate in the Anode (Safety, Fast Charging, and Long Cycle Life)
- 3:05 PM Break**

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## Session VI: Demonstrations & Impacts

Chair: Tony Andreoni

- 3:15 PM **Paul Scott/Chelsea Sexton, Plug In America**  
Historical Summary and Current Status Report
- 3:45 PM **Ron Freund/Tim Hastrup, Electric Auto Association**  
EV Usage Survey / Energy Use Data; Plugging In: One Family's Experiences
- 4:15 PM **Greg Hanssen/ Dwight MacCurdy, E drive / EnergyCS / SMUD**  
Collective Performance Summary and Data
- 4:45 PM **Stefan Unnash, Tiax**  
Assessment of Full Fuel Cycle Emissions
- 5:15 PM Open Comment Period
- 6:15 PM Day Three End**